

**(19) World Intellectual Property  
Organization  
International Bureau**



**(43) International Publication Date**  
**17 March 2005 (17.03.2005)**

**PCT**

**(10) International Publication Number**  
**WO 2005/024182 A1**

**(51) International Patent Classification<sup>7</sup>: E21B 47/18,**  
43/26

**(21) International Application Number:** PCT/GB2004/003597

**(22) International Filing Date:** 23 August 2004 (23.08.2004)

(25) Filing Language: English

(26) **Publication Language:** English

**(30) Priority Data:**  
0320804.8      5 September 2003 (05.09.2003)      GB

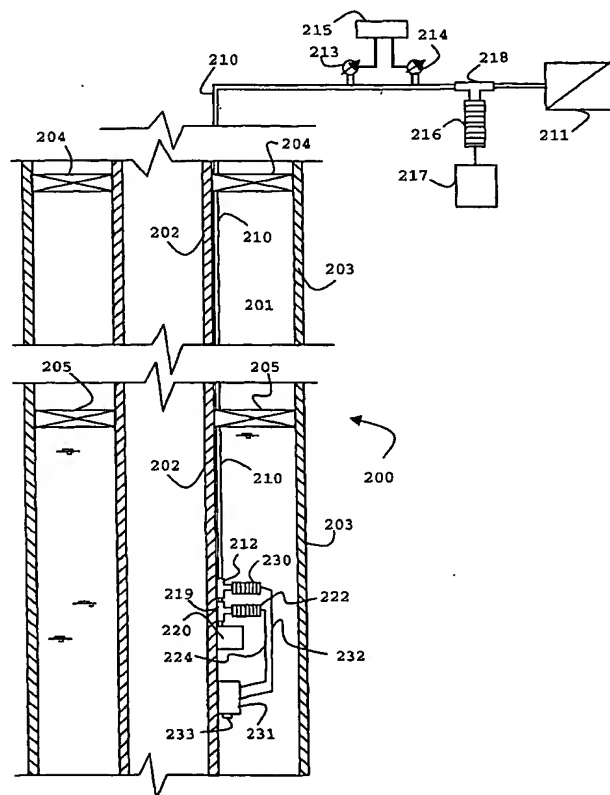
Ruyterkade 62, Willemstad, Curacao (AN). **SCHLUMBERGER CANADA LIMITED** [CA/CA]; 525 - 3rd Avenue S.W., Calgary, Alberta T2P 0G4 (CA). **SCHLUMBERGER SEACO INC.** [PA/PA]; 8 Calle Aquilino de la Guardia, Panama City (PA). **SCHLUMBERGER HOLDINGS LIMITED**; PO Box 71, Craigmuir Chambers, Road Town, Tortola (VG). **SCHLUMBERGER OILFIELD ASSISTANCE LIMITED**; Craigmuir Chambers, Road Town, Tortola (VG). **SCHLUMBERGER OVERSEAS S.A.** [PA/PA]; 8 Calle Aquilino de la Guardia, Panama City (PA). **SERVICES PETROLIERS SCHLUMBERGER** [FR/FR]; 42 rue Saint Dominique, F-75007 Paris (FR). **SCHLUMBERGER SURENCO S.A.** [PA/PA]; 8 Calle Aquilino de la Guardia, Panama City (PA).

**(71) Applicants (for all designated States except US):**  
**SCHLUMBERGER TECHNOLOGY B.V.** [NL/NL];  
 Parkstraat 83-89, NL-2514 JG The Hague (NL). **PRAD**  
**RESEARCH AND DEVELOPMENT N.V.** [NL/NL]; De

**(72) Inventors; and**  
**(75) Inventors/Applicants (for US only): HUANG, Songming**  
 [GB/GB]; 97 Limes Road, Hardwick, Cambridgeshire CB3  
 7XN (GB). **MONMONT, Frank** [FR/GB]; Rose Cottage,

*[Continued on next page]*

(54) Title: BOREHOLE TELEMETRY SYSTEM



**(57) Abstract:** An acoustic telemetry apparatus and methods for communicating digital data from a down-hole location through a borehole to the surface or between locations within the borehole are described including a receiver and a transmitter linked by an acoustic channel (210) wherein acoustic channel has a cross-sectional area of 58 cm<sup>2</sup> or less and the transmitter comprises an electro-active transducer generating a modulated continuous waveform.



Bossert's Way, Highfields, Caldecote, Cambridgeshire CB3 7PA (GB).

(74) **Agent:** CURINGTON, Timothy, W.; Intellectual Property Law Department, Schlumberger Cambridge Research Limited, High Cross, Madingley Road, Cambridge CB3 0EL (GB).

(81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,

TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— with international search report

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*